REMARKS

This amendment is submitted after final rejection under 37 CFR 1.116 because Applicants believe that all claims now presented are in condition for allowance. In any event entry of this amendment will place the present application in better form for appeal. No new issues have been raised and no new matter has been added. Finally Applicants are submitting arguments in direct response to points made by the Examiner in the last office action and Applicants could not have filed their response at an earlier date.

Applicants wish to thank Examiner Zhu for holding a telephone interview with the Applicants' undersigned representative on 18 June 2008. During the interview the Applicants' undersigned representative agreed to amend claims 1 through 5 to delete all reference to the words "two phase" in describing the hard metal substrate body and to amend claim 1, line 2 to delete the word "essentially" so that it is now clear that the hard metal substrate body according to the present invention consists of a WC hard material phase and a binder phase which apart from the binder metals Fe, Co and/or Ni, contains up to 15% by mass of a dissolved dopant. The undersigned agreed to amend claim 1 and al other claims remaining in the application to delete any reference to the words "two phase". The Examiner indicated that such a change in

the claims appears to remove the basis for rejection of the claims under 35 USC 112, second paragraph, as indefinite.

The undersigned then turned to US Patent 6,110,603 to CHEN et al, which the Examiner has applied against claims 1 through 5 under 35 USC 103. The undersigned emphasized that even though CHEN et al includes broad ranges of the elements forming the substrate bodies, in fact the reference discloses only two embodiments within that broad definition. The two embodiments are found in CHEN et al in col. 6, lines 49 to 53 and col. 7, lines 41 to 45. Applicants strongly believe that their hard metal substrate bodies as covered in the amended claims discussed during the interview, are far removed from any composition disclosed in CHEN et al so that there is no basis to reject any of the amended claims as obvious under 35 USC 103 in view of CHEN et al.

Applicants' presently claimed hard metal substrate body includes a hard material phase that consists of WC and the hard metal substrate body includes in addition to the hard material phase a relatively small amount of a binder metal phase and only a very small amount of dopant, such as titanium. The total amount of dopant present cannot exceed 15 mass% of the binder metal phase. Furthermore the amount of the dopant in the whole hard metal substrate body cannot exceed 4 mass% and the amount of the dopant that is present in undissolved form in the hard metal substrate body cannot exceed 4 volume%. The dopant present in undissolved form is present as a cubic phase. When Applicants prepare their

hard metal substrate bodies using the sinter bodies according to Compositions A through E appearing at the bottom of page 10 of the specification, it is clearly seen that the amount of dopant is a very small percentage of the entire composition. See for instance in Composition A the amount of Ti_2AlC is only 0.5% of the composition, where 92% of the composition is WC (hard material phase) and 7.5% of the composition is cobalt (binder phase).

Returning to the compositions in CHEN et al in col. 6, lines 49 to 53 and col. 7, lines 41 to 45, it is noted that TiC, TiN and mixtures of the two form significant amounts of the hard metal substrate bodies, and that the total amount of such titanium dopant in the CHEN et al compositions is in the range of about 20% of the hard metal substrate bodies disclosed in the reference, far higher than the amounts in Applicants' Compositions A through E on page 10 of the application and far higher as well than the maximum percentage of dopant called for in claims 1 through 5 as a percentage of the entire hard metal substrate body.

Applicants' claimed compositions are relatively simple compared to those disclosed in CHEN et al, for instance in Fig. 6. Applicants' compositions include principally the WC hard material phase, the metal binder phase, and then the dopant. Much of the dopant is dissolved in the binder phase, but some of the dopant may be present in undissolved form as the carbide, nitride or carbonitride of the metal dopant. The object of the present invention is to dissolve as much of the dopant as possible in the

metal binder phase and to avoid the formation of carbides or nitrides of the dopants, which form the undesired cubic phase that Applicants keep to a maximum of 4 volume%.See the last paragraph of page 8 of the present specification. The carbides and nitrides of the metal dopants are characteristic of the CHEN et al hard metal substrate bodies; once again, see col. 6, lines 49 to 53 and col. 7, lines 41 to 45 of the reference.

Not only do the Applicants' presently claimed hard metal substrate bodies contain far less Ti and/or other dopants than the hard metal substrate bodies disclosed in CHEN et al, but furthermore there are other differences in the structure and the properties of the hard metal substrate bodies in comparison to those disclosed in CHEN et al. Figure 6 in CHEN et al discloses a good picture of the CHEN et al hard metal substrate bodies, which are a complex series of layers. According to CHEN et al, the hard material phase is layer 15, on top of layer 15 is layer 20 which is rich in both Co binder metal and Ti dopant. On top of layer 20 is layer 19 which contains principally a hard material phase, such as WC, and a metal binder phase, such as cobalt, and on top of layer 19 is layer 18, which comprises a binder-free carbonitride phase of the dopant such as titanium carbonitride. None of these layers is characteristic of the presently claimed hard metal substrate body. The presently claimed hard metal substrate body consists of the hard material phase, a lesser amount of a binder metal phase, and a still lesser amount of a metal dopant. The hard metal substrate

body contains less dopant and contains more binder metal, the deeper below the surface of the hard metal substrate body one explores. There is no complex series of layers as in CHEN et al.

In particular Applicants' hard metal substrate body is not coated with a layer, such as layer 18 in Fig. 6 of CHEN et al, which is a layer of a dopant metal carbonitride. Such a layer would not permnit the Applicants to apply a further layer of diamond or other hard material onto the surface of their hard metal substrate body, which is an object of the present invention. See page 6, lines 6 through 11 of the specification. Furthermore there is no disclosure in the present invention of a layer such as layer 20 in Fig. 6 of CHEN et al, which is a deep-down layer comprising metal binder and dopant. No such layer is included in the presently claimed hard metal substrate bodies.

The undersigned emphasized that the object of the present invention is to provide an improved hard metal body which by comparison to the known hard metal substrate bodies has an improved adhesion to surface coatings, which are deposited from the gas phase. Such coatings can for example be composed of diamond, amorphous carbon, cubic boron nitride, carbon nitrides, oxides, as well as metallic hard materials of carbides, nitrides, carbonitrides and oxicarbonitrides, especially of the elements of Groups Iva to Via of the Periodic Table. On the other hand the object of the invention in CHEN et al is to develop hard metal or cermet bodies which have an increased resistance to wear and

durability useful as cutting tools. These hard metal substrate bodies are uncoated.

Examiner Zhu listened to the undersigned's presentation of the arguments. The Examiner noted the argument that the presently claimed hard metal substrate bodies contain far less metal dopant than the hard metal substrate bodies disclosed in CHEN et al. The Examiner pointed to claim 5 of CHEN et al with its reference to chromium and molybdenum present in either the hard material phase or the binder phase in amounts of up to 2% and asked if the Cr and Mo addition s are also dopants and, if so, how this small amount of dopant is distinguishable from the presently claimed invention. The undersigned pointed out that the up to 2% Cr or Mo is in addition to the large amount of Ti dopant present as the carbide, nitride or carbonitride present in the CHEN et al compositions. Once again, see col. 6, lines 49 to 53 and col. 7, lines 41 to 45.

Examiner Zhu indicated that Applicants should file an Amendment Under 37 CFR 1.116 After Final Rejection in which Applicants make the changes in the claims, as discussed, and in which Applicants include all of the arguments to distinguish those claims over the disclosure in CHEN et al. Applicants have now prepared and submitted such an amendment.

The undersigned also pointed to the withdrawn claims 6 through 12 directed to a process for producing a hard metal substrate body, and asked the Examiner if there was a chance to

obtain the allowance of these claims as well. The Examiner noted that these claims have been withdrawn, though Applicants have not canceled those claims. The Examiner indicated that Applicants should amend claims 6 through 12 to delete all reference to two-phase hard metal substrate bodies. If the Examiner decides that claims 1 through 5 are allowable, he may then also agree to allow claims 6 through 12. Therefore applicants have amended claims 6 through 12 to delete any reference to a two-phase hard metal substrate body.

Applicants believe that all claims now presented are patentably distinguishable over the CHEN et al reference and that no rejection of any claim now presented should be maintained as obvious under 35 USC 103.

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